



May 12, 2017

Reference No. 003978

Alex Bodenheimer
1901 N. 2nd Street
Wausau, Wisconsin 54403

Dear Mr. Bodenheimer:

**Re: Sub-slab and Indoor Air Sampling Results
1901 N. 2nd Street, Wausau, Wisconsin 54403**

On behalf of the Responsible Parties (RPs) for the Wausau Water Supply Superfund Site, enclosed are the results of a recent investigation on your property by GHD Services Inc. (GHD).

As you are aware, this investigation was conducted because of the potential for contaminant vapors from the groundwater beneath your property to migrate through soils, accumulate beneath the foundation of your house, and possibly enter your indoor air. The contaminants of concern in the groundwater are tetrachloroethene (PERC) and trichloroethene (TCE). The history of the Superfund project and the potential concerns to neighboring property owners were described in the original letter sent to you on March 13, 2017.

On April 4, 2017, GHD installed a sampling device into the floor of your foundation and collected a soil vapor sample. In addition, an indoor air sample was collected on the basement level of your home. The samples were submitted to Test America Laboratories where they underwent laboratory analysis for four different volatile organic compounds (VOCs), including PERC, TCE, cis-1,2-dichloroethylene (c12DCE), and vinyl chloride (VC).

1. Your Sub-slab Test Results

Attached is a copy of the laboratory report for your sub-slab vapor sample. The results show that PERC, TCE, and c12DCE were detected in the sample taken from beneath your foundation. Although these compounds were detected in soil vapors beneath your basement, the levels at which they were detected are such that they do not pose a threat to you or your family. This is called "detections below screening levels" as explained in the enclosed fact sheet. The sub-slab results for your property are summarized in Table 1 below and the Wisconsin screening levels for sub-slab vapors at residential properties are included for comparison.

Table 1 Sub-slab Results and Wisconsin Screening Levels

| | Date | Units | PERC | TCE | c12-DCE | VC |
|----------------------------------------------------|--------|-------|-------|-----|---------|--------|
| 1901 N. 2 nd Street Sub-slab Results | 4/4/17 | µg/m3 | 130 | 11 | 9.6 | <0.074 |
| Wisconsin Residential Sub-slab Screening Levels | --- | µg/m3 | 1,400 | 70 | ---(1) | 57 |



2. Your Indoor Air Test Results

The indoor air results are also provided in the attached laboratory report. The results show that a very small amount of PERC was detected in the sample taken from the basement of your home. Although detected, the PERC level was below the action level set by the State of Wisconsin, indicating that it does not pose a threat to you or your family. The indoor air results are summarized in Table 2 below and the Wisconsin action levels for indoor air at residential properties are included for comparison.

Table 2 Indoor Air Results and Wisconsin Action Levels

| | Date | Units | PERC | TCE | c12DCE | VC |
|-----------------------------------------------------------|--------|-------|------|--------|--------|--------|
| 1901 N. 2 nd Street Indoor Air Results | 4/4/17 | µg/m3 | 0.15 | <0.075 | <0.095 | <0.074 |
| <i>Wisconsin Residential Indoor Air Action Levels</i> | --- | µg/m3 | 42 | 2.1 | ---(1) | 1.7 |

(1) Neither the State of Wisconsin nor the USEPA have set a health standard for c12DCE in air

At this time, there does not appear to be a risk of significant vapor concentrations entering your home from beneath the foundation. Additional sampling will be scheduled for mid-summer and we will contact you to schedule the next sampling event.

The Project Managers for USEPA and WDNR are Sheri Bianchin and Mae Willkom, respectively. Ms. Bianchin can be reached at bianchin.sheri@epa.gov or 312-886-4745. Ms. Willkom can be reached at or 715-839-3748.

Please feel free to contact me at 651-639-0913 if you have any questions about these results.

Sincerely,

GHD

Chuck Ahrens

651-639-0913

CA/sb/1

Encl.

cc: Mae Willkom, DNR
Sheri Bianchin, USEPA
RP Group

Attachment A Laboratory Report

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

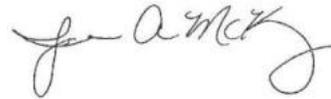
ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

TestAmerica Job ID: 140-7756-1
Client Project/Site: Wausau Vapor Sampling

For:
GHD Services Inc.
1801 Old Highway 8 NW
Suite 114
St. Paul, Minnesota 55112

Attn: Mr. Grant Anderson



Authorized for release by:
4/20/2017 3:13:31 PM

Jamie McKinney, Senior Project Manager
(865)291-3000
jamie.mckinney@testamericainc.com

LINKS

Review your project
results through
TotalAccess

Have a Question?



Visit us at:
www.testamericainc.com

This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17



Table of Contents

| | |
|----------------------------------------|----|
| Cover Page | 1 |
| Table of Contents | 2 |
| Definitions/Glossary | 3 |
| Case Narrative | 4 |
| Detection Summary | 5 |
| Client Sample Results | 7 |
| Default Detection Limits | 11 |
| Surrogate Summary | 12 |
| QC Sample Results | 13 |
| QC Association Summary | 14 |
| Lab Chronicle | 15 |
| Certification Summary | 17 |
| Method Summary | 18 |
| Sample Summary | 19 |
| Chain of Custody | 20 |
| Receipt Checklists | 23 |
| Clean Canister Certification | 24 |
| Clean Canister Data | 24 |

Definitions/Glossary

Client: GHD Services Inc.
Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-7756-1

Qualifiers

Air - GC/MS VOA

| Qualifier | Qualifier Description |
|-----------|----------------------------------------------------------------------------------------------------------------|
| J | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |
| E | Result exceeded calibration range. |

Glossary

| Abbreviation | These commonly used abbreviations may or may not be present in this report. |
|----------------|-------------------------------------------------------------------------------------------------------------|
| α | Listed under the "D" column to designate that the result is reported on a dry weight basis |
| %R | Percent Recovery |
| CFL | Contains Free Liquid |
| CNF | Contains no Free Liquid |
| DER | Duplicate error ratio (normalized absolute difference) |
| Dil Fac | Dilution Factor |
| DL, RA, RE, IN | Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample |
| DLC | Decision level concentration |
| MDA | Minimum detectable activity |
| EDL | Estimated Detection Limit |
| MDC | Minimum detectable concentration |
| MDL | Method Detection Limit |
| ML | Minimum Level (Dioxin) |
| NC | Not Calculated |
| ND | Not detected at the reporting limit (or MDL or EDL if shown) |
| PQL | Practical Quantitation Limit |
| QC | Quality Control |
| RER | Relative error ratio |
| RL | Reporting Limit or Requested Limit (Radiochemistry) |
| RPD | Relative Percent Difference, a measure of the relative difference between two points |
| TEF | Toxicity Equivalent Factor (Dioxin) |
| TEQ | Toxicity Equivalent Quotient (Dioxin) |

Case Narrative

Client: GHD Services Inc.
Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-7756-1

Job ID: 140-7756-1

Laboratory: TestAmerica Knoxville

Narrative

Job Narrative
140-7756-1

Comments

No additional comments.

Receipt

The samples were received on 4/10/2017 10:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

Air - GC/MS VOA

This report includes canister certification data for the batch certified canisters used to collect samples. All of the canisters used for sample collection for this job were batch certified clean to the levels listed on the results page. Additionally, the canisters were checked down to the method detection limit (MDL) for chloroform.

Method(s) TO 15 LL, TO-14A, TO-15: EPA methods TO-14A and TO-15 specify the use of humidified "zero air" as the blank reagent for canister cleaning, instrument calibration and sample analysis. Ultra-high purity humidified nitrogen from a cryogenic reservoir is used in place of "zero air" by TestAmerica Knoxville.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17

Client Sample ID: SS-170404-RA-07 1901 N. 2nd St. Lab Sample ID: 140-7756-7
 Date Collected: 04/04/17 15:20 Sub-slab Matrix: Air
 Date Received: 04/10/17 10:15
 Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|------------------------|--------|-----------|-------|-------|---------|---|----------|----------------|---------|
| cis-1,2-Dichloroethene | 2.4 | | 0.080 | 0.024 | ppb v/v | | | 04/17/17 21:31 | 1 |
| Tetrachloroethene | 17 | E | 0.080 | 0.016 | ppb v/v | | | 04/17/17 21:31 | 1 |
| Trichloroethene | 2.0 | | 0.040 | 0.014 | ppb v/v | | | 04/17/17 21:31 | 1 |
| Vinyl chloride | ND | | 0.040 | 0.029 | ppb v/v | | | 04/17/17 21:31 | 1 |

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|------------------------|--------|-----------|------|-------|-------|---|----------|----------------|---------|
| cis-1,2-Dichloroethene | 9.6 | | 0.32 | 0.095 | ug/m3 | | | 04/17/17 21:31 | 1 |
| Tetrachloroethene | 120 | E | 0.54 | 0.11 | ug/m3 | | | 04/17/17 21:31 | 1 |
| Trichloroethene | 11 | | 0.21 | 0.075 | ug/m3 | | | 04/17/17 21:31 | 1 |
| Vinyl chloride | ND | | 0.10 | 0.074 | ug/m3 | | | 04/17/17 21:31 | 1 |

| Surrogate | %Recovery | Qualifier | Limits | Prepared | Analyzed | Dil Fac |
|-----------------------------|-----------|-----------|----------|----------|----------------|---------|
| 4-Bromofluorobenzene (Surr) | 91 | | 60 - 140 | | 04/17/17 21:31 | 1 |

Part 2

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) - DL

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|-------------------|--------|-----------|------|-------|---------|---|----------|----------------|---------|
| Tetrachloroethene | 19 | | 0.40 | 0.080 | ppb v/v | | | 04/18/17 09:43 | 1 |

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|-------------------|--------|-----------|-----|------|-------|---|----------|----------------|---------|
| Tetrachloroethene | 130 | | 2.7 | 0.54 | ug/m3 | | | 04/18/17 09:43 | 1 |

| Surrogate | %Recovery | Qualifier | Limits | Prepared | Analyzed | Dil Fac |
|-----------------------------|-----------|-----------|----------|----------|----------------|---------|
| 4-Bromofluorobenzene (Surr) | 111 | | 60 - 140 | | 04/18/17 09:43 | 1 |

E- result exceeded the instrument calibration range. The analysis was repeated as shown in Part 2.



Client Sample ID: IA-170404-RA-04

1901 N. 2nd St.

Lab Sample ID: 140-7756-3

Date Collected: 04/04/17 16:40

Indoor Air - Basement

Matrix: Air

Date Received: 04/10/17 10:15

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|--------------------------|--------------|-----------|-------|-------|---------|---|----------|----------------|---------|
| cis-1,2-Dichloroethene | ND | | 0.080 | 0.024 | ppb v/v | | | 04/17/17 18:47 | 1 |
| Tetrachloroethene | 0.023 | J | 0.080 | 0.016 | ppb v/v | | | 04/17/17 18:47 | 1 |
| Trichloroethene | ND | | 0.040 | 0.014 | ppb v/v | | | 04/17/17 18:47 | 1 |
| Vinyl chloride | ND | | 0.040 | 0.029 | ppb v/v | | | 04/17/17 18:47 | 1 |
| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
| cis-1,2-Dichloroethene | ND | | 0.32 | 0.095 | ug/m3 | | | 04/17/17 18:47 | 1 |
| Tetrachloroethene | 0.15 | J | 0.54 | 0.11 | ug/m3 | | | 04/17/17 18:47 | 1 |
| Trichloroethene | ND | | 0.21 | 0.075 | ug/m3 | | | 04/17/17 18:47 | 1 |

TestAmerica Knoxville

Client Sample Results

Client: GHD Services Inc.
 Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-7756-1

Client Sample ID: IA-170404-RA-04 *1901 N. 2nd St. (cont'd.)* **Lab Sample ID:** 140-7756-3
Date Collected: 04/04/17 16:40 *Indoor Air - Basement* **Matrix:** Air
Date Received: 04/10/17 10:15
Sample Container: Summa Canister 6L

| Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS) (Continued) | | | | | | | | | |
|-----------------------------------------------------------------------------------------------------|-----------|-----------|----------|-------|-------|---|----------|----------------|---------|
| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
| Vinyl chloride | ND | | 0.10 | 0.074 | ug/m3 | | | 04/17/17 18:47 | 1 |
| Surrogate | %Recovery | Qualifier | Limits | | | | Prepared | Analyzed | Dil Fac |
| 4-Bromofluorobenzene (Surr) | 96 | | 60 - 140 | | | | | 04/17/17 18:47 | 1 |



Attachment B Fact Sheet



Understanding Chemical Vapor Intrusion Testing Results

RR-977

October 2014

From the Lab to You

Chemical vapor samples were taken from underneath your house or building and possibly indoors as well. These samples have been tested by a certified laboratory and a report was issued. The Wisconsin Department of Natural Resources (DNR) uses these test results to determine if people in the building are being exposed to chemical vapors coming from nearby contaminated soil or groundwater, and to decide what, if any, action is needed to prevent this exposure.

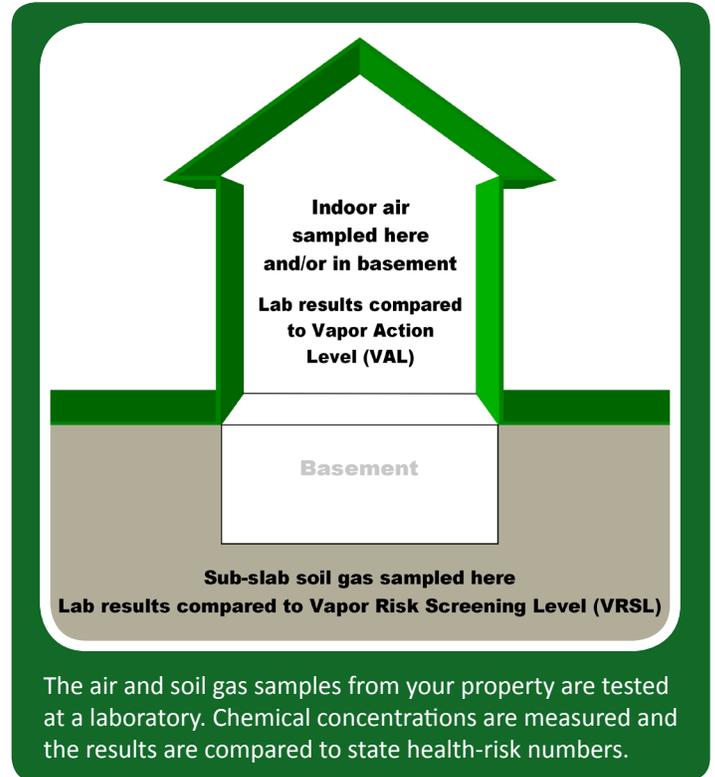
Indoor Air Testing Results

If indoor air samples were collected in your house or building, test results from the lab will be compared to the state Vapor Action Level (VAL) for chemicals of concern. The VAL is a chemical compound's numerical value that represents a health hazard risk to no more than 1 in 100,000 people during a lifetime of exposure. If test results show chemical concentrations in your air below the VAL then adverse health effects are extremely rare, even if you were to breathe the chemical at this concentration for your entire life.

Test results showing chemical concentrations in the air at or above the VAL prompt DNR to recommend that exposure to these chemical vapors be reduced. If test results show concentrations significantly above the VAL, or more than one type of chemical vapor is identified in your indoor air, the risk from exposure increases. If the concentration of any indoor chemical vapor greatly exceeds the VAL, DNR is concerned about even short-term exposure and will typically require immediate action to address the problem.

The VAL for each chemical is set by scientific research. It is protective of all people, including those who are most susceptible to adverse health effects.

If test results identify chemicals in your air that are not present in nearby soil or groundwater contamination, it is likely that these vapors are coming from some product or activity in or near your house or building. Many everyday consumer products (e.g., cleaners, solvents, polish, adhesives, lubricants, aerosols, insect repellants, etc.); combustion processes (e.g., smoking, home heating); fuels in attached garages; dry cleaned clothing or draperies; and occupant activities (e.g., craft hobbies), also release chemical vapors into the air.



Sub-slab Soil Gas Testing Results

Soil gas samples were collected from the ground beneath the concrete slab of your building foundation or basement. The lab measured the concentrations of various chemicals in these samples. DNR compares these measurements to the state Vapor Risk Screening Level (VRSL), which identifies the concentration of a chemical in soil gas that scientific research suggests can be a health risk if vapor enters a building. If soil gas measurements exceed the VRSL for a chemical of concern, action to reduce exposure is strongly recommended.

The VRSL is a higher number (higher chemical concentration) than the VAL because it is presumed that concrete building foundations and basement walls will prevent most soil gas from entering a building. Further, any soil gas that does enter a building through cracks, holes, sump pumps, drains, etc., will be diluted to some extent by the indoor air. So, people inside will not be breathing air that includes the full concentration of chemical vapors that exist in the ground.



Wisconsin Department of Natural Resources
P.O. Box 7921, Madison, WI 53707
dnr.wi.gov, search "Brownfields"



DNR generally relies on the test results of the sub-slab soil gas samples when determining what, if any, action should be taken related to chemical vapors coming from nearby soil or groundwater contamination. Indoor air quality is highly variable, and it is difficult to make a definitive decision about vapor intrusion based on indoor air sampling alone.

Follow-Up Actions

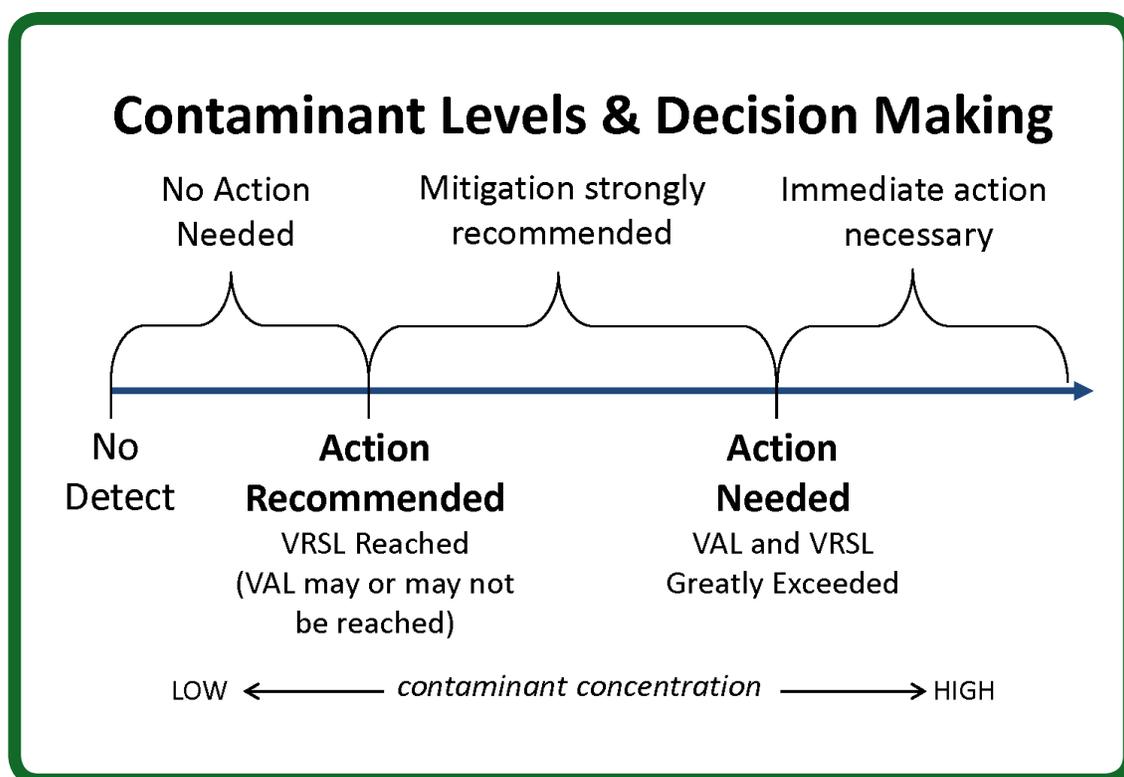
If your test results are less than a VAL for indoor air, or a VRSL for sub-slab soil gas, then the air in the house or building should not present a health concern. Follow-up sampling and testing may be necessary to confirm the results, but no other action is typically suggested.

When test results show soil gas chemical concentrations above a VRSL, both DNR and the Wisconsin Department of

Health Services recommend that owners take action to reduce potential exposure. This typically involves installing a vapor mitigation system that vents chemical vapors from beneath your home or building to the outdoors, similar to a radon mitigation system.

If indoor air concentrations exceed a VAL, but sub-slab concentrations are less than a VRSL, then the chemical vapors are most likely coming from indoor sources. Steps should be taken by the house or building owner to identify the products and practices causing the problem and implement appropriate remedies.

If soil gas mitigation is recommended, a representative of the party who is responsible for the soil or groundwater contamination will contact you to discuss your options.



A Note about Measurement Units: The lab report may include some unfamiliar technical language. The most important point to note is whether or not the test result for a specific chemical exceeds a VAL or VRSL, which are also sometimes referred to, generically, as “screening levels.”

The concentration of gaseous pollutants in air is typically described in two different ways: 1) as units of mass per volume, where $\mu\text{g}/\text{m}^3$ represents micrograms of gaseous pollutant per cubic meter of ambient air; and 2) as parts per billion by volume (ppbv), where the volume of a gaseous pollutant is compared to a set volume of ambient air. These are the numbers that are compared to the VAL and VRSL.

For more information, visit dnr.wi.gov/topic/Brownfields/Vapor.html



May 11, 2017

Reference No. 003978

Ms. Cathy Kraus
1917 N. 2nd Street
Wausau, Wisconsin 54403

Dear Ms. Kraus:

**Re: Indoor Air Sampling Results
Kraus Residence, 1917 N. 2nd Street, Wausau, Wisconsin 54403**

On behalf of the Responsible Parties (RPs) for the Wausau Water Supply Superfund Site, enclosed are the results of a recent investigation on your property by GHD Services Inc. (GHD).

As you are aware, this investigation was conducted because of the potential for contaminant vapors from the groundwater beneath your property to migrate through soils, accumulate beneath the foundation of your home, and possibly enter your indoor air. The contaminants of concern in the groundwater are tetrachloroethene (PERC) and trichloroethene (TCE). The history of this site and the potential concerns to neighboring residents were described in detail in the original letter sent to your home.

On April 4, 2017, GHD installed a sampling device into the floor of your foundation and collected a soil vapor sample. In addition, an indoor air sample was collected on the main floor of your home. The samples were submitted to Test America Laboratories where they underwent laboratory analysis for four different volatile organic compounds (VOCs), including PERC, TCE, cis-1,2-dichloroethylene (c12DCE), and vinyl chloride (VC).

1. Your Sub-slab Test Results

Attached is a copy of the laboratory report for your sub-slab air sample. The results show that small amounts of each of the four VOCs were detected in the sample taken from beneath your foundation. Although these compounds were detected in soil vapors beneath your basement, the levels at which they were detected are such that they do not pose a threat to you or your family. This is called "detections below screening levels" as explained in the enclosed fact sheet. The sub-slab results for your property are summarized in Table 1 below and the Wisconsin screening levels for sub-slab vapors at a residential property are included for comparison.

Table 1 Sub-slab Results and Wisconsin Screening Levels

| | Date | Units | PERC | TCE | c12DCE | VC |
|----------------------------------------------------|--------|-------------------|-------|-----|--------|---------|
| 1917 N. 2 nd Street Sub-slab Results | 4/4/17 | µg/m ³ | 110 | 12 | 0.52 | 0.086 J |
| Wisconsin Res. Sub-slab Screening Levels | --- | µg/m ³ | 1,400 | 70 | ---(1) | 57 |



2. Your Indoor Air Test Results

The indoor air results are also provided in the attached laboratory report. The results show that very small amounts of three VOCs were detected in the sample taken from the main floor of your house. Although these compounds were detected, the levels were below the action levels set by the State of Wisconsin, indicating that they do not pose a threat to you or your family. The indoor air results for your house are summarized in Table 2 below and the Wisconsin action levels for indoor air at a residential property are included for comparison.

As you can see, the TCE concentration in the indoor air sample is just slightly lower than the Wisconsin action level. The indoor air results were also compared to the United States Environmental Protection Agency (USEPA) indoor air screening levels, which are lower than the Wisconsin action levels. As shown in Table 2, the TCE value reported for your indoor air (1.8 µg/m³) was higher than the USEPA screening level, which is 0.48 µg/m³. This USEPA screening level is very low and studies have shown that TCE concentrations at that level are common in many homes in the United States due to the presence of common products such as adhesives, lubricants, and cleaning solutions.

Table 2 Indoor Air Results and Wisconsin Action Levels

| | Date | Units | PERC | TCE | c12DCE | VC |
|------------------------------------------------------------------------------------------------|--------|-------------------|------|-------------|--------|--------|
| 1917 N. 2 nd Street Indoor Air Results | 4/4/17 | µg/m ³ | 0.70 | 1.8 | 0.42 | <0.074 |
| <i>Wisconsin Res. Indoor Air Action Levels</i> | --- | µg/m ³ | 42 | 2.1 | ---(1) | 1.7 |
| <i>USEPA Res. Indoor Air Screening Level</i> | --- | µg/m ³ | 11 | 0.48 | ---(1) | 0.17 |
| (1) Neither the State of Wisconsin nor the USEPA have set a health standard for c12DCE in air. | | | | | | |

The DNR and USEPA action levels for TCE are set to provide threshold concentrations for TCE that are protective of human health over long-term exposure. It is the experience of DNR and the Wisconsin Department of Health Services (DHS) in investigating similar cases at other locations in the state that the potential health risk for you is low. The vapor levels measured in the indoor air at your home present a potential long-term risk, not an immediate one, to occupants of the house.

3. Next Steps

We recommend the following action at this time:

We would like to collect a second set of samples from beneath your foundation, in your basement, and on the main floor of your house to verify these results. This second set of samples would be collected at your earliest convenience.



You will be contacted by GHD to schedule the sampling. As before, any costs related to this investigation will be paid by the RPs.

The Project Managers for USEPA and WDNR are Sheri Bianchin and Mae Willkom, respectively. Ms. Bianchin can be reached at bianchin.sheri@epa.gov or 312-886-4745. Ms. Willkom can be reached at or 715-839-3748.

Please feel free to contact me at 651-639-0913 if you have any questions about these results.

Sincerely,

GHD

A handwritten signature in black ink, appearing to read 'Chuck Ahrens'.

Chuck Ahrens

CA/sb/1

Encl.

cc: Mae Willkom, DNR
Sheri Bianchin, USEPA
RP Group

Attachment A Laboratory Report

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

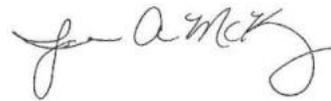
TestAmerica Job ID: 140-7756-1

Client Project/Site: Wausau Vapor Sampling

For:

GHD Services Inc.
1801 Old Highway 8 NW
Suite 114
St. Paul, Minnesota 55112

Attn: Mr. Grant Anderson



Authorized for release by:
4/20/2017 3:13:31 PM

Jamie McKinney, Senior Project Manager
(865)291-3000
jamie.mckinney@testamericainc.com

LINKS

Review your project
results through
TotalAccess

Have a Question?



Visit us at:
www.testamericainc.com

This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17



Table of Contents

| | |
|----------------------------------------|----|
| Cover Page | 1 |
| Table of Contents | 2 |
| Definitions/Glossary | 3 |
| Case Narrative | 4 |
| Detection Summary | 5 |
| Client Sample Results | 7 |
| Default Detection Limits | 11 |
| Surrogate Summary | 12 |
| QC Sample Results | 13 |
| QC Association Summary | 14 |
| Lab Chronicle | 15 |
| Certification Summary | 17 |
| Method Summary | 18 |
| Sample Summary | 19 |
| Chain of Custody | 20 |
| Receipt Checklists | 23 |
| Clean Canister Certification | 24 |
| Clean Canister Data | 24 |

Definitions/Glossary

Client: GHD Services Inc.
Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-7756-1

Qualifiers

Air - GC/MS VOA

| Qualifier | Qualifier Description |
|-----------|----------------------------------------------------------------------------------------------------------------|
| J | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |
| E | Result exceeded calibration range. |

Glossary

| Abbreviation | These commonly used abbreviations may or may not be present in this report. |
|----------------|-------------------------------------------------------------------------------------------------------------|
| α | Listed under the "D" column to designate that the result is reported on a dry weight basis |
| %R | Percent Recovery |
| CFL | Contains Free Liquid |
| CNF | Contains no Free Liquid |
| DER | Duplicate error ratio (normalized absolute difference) |
| Dil Fac | Dilution Factor |
| DL, RA, RE, IN | Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample |
| DLC | Decision level concentration |
| MDA | Minimum detectable activity |
| EDL | Estimated Detection Limit |
| MDC | Minimum detectable concentration |
| MDL | Method Detection Limit |
| ML | Minimum Level (Dioxin) |
| NC | Not Calculated |
| ND | Not detected at the reporting limit (or MDL or EDL if shown) |
| PQL | Practical Quantitation Limit |
| QC | Quality Control |
| RER | Relative error ratio |
| RL | Reporting Limit or Requested Limit (Radiochemistry) |
| RPD | Relative Percent Difference, a measure of the relative difference between two points |
| TEF | Toxicity Equivalent Factor (Dioxin) |
| TEQ | Toxicity Equivalent Quotient (Dioxin) |

Case Narrative

Client: GHD Services Inc.
Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-7756-1

Job ID: 140-7756-1

Laboratory: TestAmerica Knoxville

Narrative

**Job Narrative
140-7756-1**

Comments

No additional comments.

Receipt

The samples were received on 4/10/2017 10:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

Air - GC/MS VOA

This report includes canister certification data for the batch certified canisters used to collect samples. All of the canisters used for sample collection for this job were batch certified clean to the levels listed on the results page. Additionally, the canisters were checked down to the method detection limit (MDL) for chloroform.

Method(s) TO 15 LL, TO-14A, TO-15: EPA methods TO-14A and TO-15 specify the use of humidified "zero air" as the blank reagent for canister cleaning, instrument calibration and sample analysis. Ultra-high purity humidified nitrogen from a cryogenic reservoir is used in place of "zero air" by TestAmerica Knoxville.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Client Sample Results

Client: GHD Services Inc.
Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-7756-1

Client Sample ID: IA-170404-RA-05

Lab Sample ID: 140-7756-4

Date Collected: 04/04/17 11:30

1917 N. 2nd Street (Kraus) Indoor Air

Matrix: Air

Date Received: 04/10/17 10:15

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|-----------------------------|-----------|-----------|----------|-------|---------|---|----------|----------------|---------|
| cis-1,2-Dichloroethene | 0.10 | | 0.080 | 0.024 | ppb v/v | | | 04/17/17 19:44 | 2 |
| Tetrachloroethene | 0.10 | | 0.080 | 0.016 | ppb v/v | | | 04/17/17 19:44 | 2 |
| Trichloroethene | 0.33 | | 0.040 | 0.014 | ppb v/v | | | 04/17/17 19:44 | 2 |
| Vinyl chloride | ND | | 0.040 | 0.029 | ppb v/v | | | 04/17/17 19:44 | 2 |
| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
| cis-1,2-Dichloroethene | 0.42 | | 0.32 | 0.095 | ug/m3 | | | 04/17/17 19:44 | 2 |
| Tetrachloroethene | 0.70 | | 0.54 | 0.11 | ug/m3 | | | 04/17/17 19:44 | 2 |
| Trichloroethene | 1.8 | | 0.21 | 0.075 | ug/m3 | | | 04/17/17 19:44 | 2 |
| Vinyl chloride | ND | | 0.10 | 0.074 | ug/m3 | | | 04/17/17 19:44 | 2 |
| Surrogate | %Recovery | Qualifier | Limits | | | | Prepared | Analyzed | Dil Fac |
| 4-Bromofluorobenzene (Surr) | 92 | | 60 - 140 | | | | | 04/17/17 19:44 | 2 |

Client Sample Results

Client: GHD Services Inc.
Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-7756-1

Client Sample ID: SS-170404-RA-08

Lab Sample ID: 140-7756-8

Date Collected: 04/04/17 16:48

1917 N. 2nd Street (Kraus) Sub-slab

Matrix: Air

Date Received: 04/10/17 10:15

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|-----------------------------|-----------|-----------|----------|-------|---------|---|----------|----------------|---------|
| cis-1,2-Dichloroethene | 0.13 | | 0.080 | 0.024 | ppb v/v | | | 04/17/17 22:26 | 1.56 |
| Tetrachloroethene | 16 | | 0.080 | 0.016 | ppb v/v | | | 04/17/17 22:26 | 1.56 |
| Trichloroethene | 2.2 | | 0.040 | 0.014 | ppb v/v | | | 04/17/17 22:26 | 1.56 |
| Vinyl chloride | 0.034 | J | 0.040 | 0.029 | ppb v/v | | | 04/17/17 22:26 | 1.56 |
| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
| cis-1,2-Dichloroethene | 0.52 | | 0.32 | 0.095 | ug/m3 | | | 04/17/17 22:26 | 1.56 |
| Tetrachloroethene | 110 | | 0.54 | 0.11 | ug/m3 | | | 04/17/17 22:26 | 1.56 |
| Trichloroethene | 12 | | 0.21 | 0.075 | ug/m3 | | | 04/17/17 22:26 | 1.56 |
| Vinyl chloride | 0.086 | J | 0.10 | 0.074 | ug/m3 | | | 04/17/17 22:26 | 1.56 |
| Surrogate | %Recovery | Qualifier | Limits | | | | Prepared | Analyzed | Dil Fac |
| 4-Bromofluorobenzene (Surr) | 91 | | 60 - 140 | | | | | 04/17/17 22:26 | 1.56 |



Attachment B Fact Sheet



Understanding Chemical Vapor Intrusion Testing Results

From the Lab to You

Chemical vapor samples were taken from underneath your house or building and possibly indoors as well. These samples have been tested by a certified laboratory and a report was issued. The Wisconsin Department of Natural Resources (DNR) uses these test results to determine if people in the building are being exposed to chemical vapors coming from nearby contaminated soil or groundwater, and to decide what, if any, action is needed to prevent this exposure.

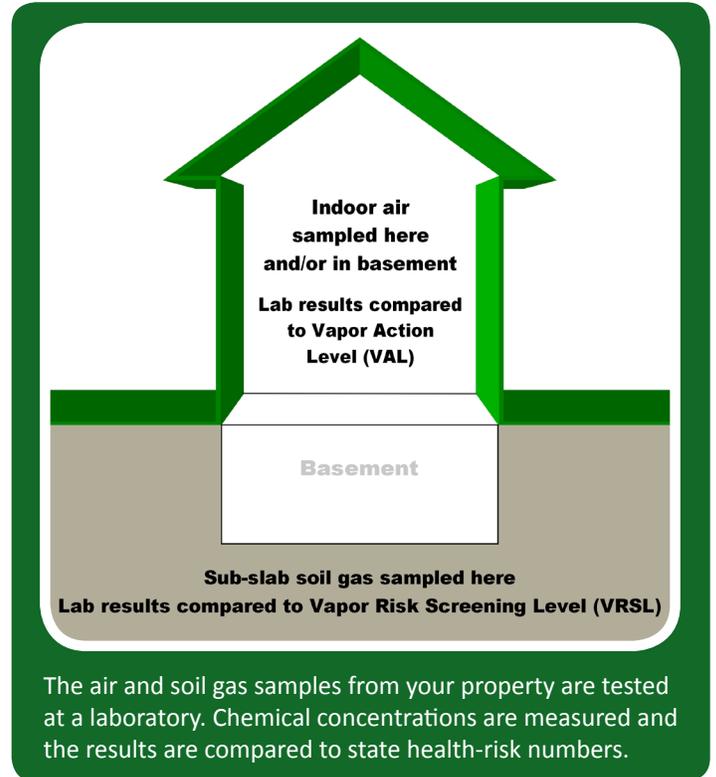
Indoor Air Testing Results

If indoor air samples were collected in your house or building, test results from the lab will be compared to the state Vapor Action Level (VAL) for chemicals of concern. The VAL is a chemical compound's numerical value that represents a health hazard risk to no more than 1 in 100,000 people during a lifetime of exposure. If test results show chemical concentrations in your air below the VAL then adverse health effects are extremely rare, even if you were to breathe the chemical at this concentration for your entire life.

Test results showing chemical concentrations in the air at or above the VAL prompt DNR to recommend that exposure to these chemical vapors be reduced. If test results show concentrations significantly above the VAL, or more than one type of chemical vapor is identified in your indoor air, the risk from exposure increases. If the concentration of any indoor chemical vapor greatly exceeds the VAL, DNR is concerned about even short-term exposure and will typically require immediate action to address the problem.

The VAL for each chemical is set by scientific research. It is protective of all people, including those who are most susceptible to adverse health effects.

If test results identify chemicals in your air that are not present in nearby soil or groundwater contamination, it is likely that these vapors are coming from some product or activity in or near your house or building. Many everyday consumer products (e.g., cleaners, solvents, polish, adhesives, lubricants, aerosols, insect repellants, etc.); combustion processes (e.g., smoking, home heating); fuels in attached garages; dry cleaned clothing or draperies; and occupant activities (e.g., craft hobbies), also release chemical vapors into the air.



Sub-slab Soil Gas Testing Results

Soil gas samples were collected from the ground beneath the concrete slab of your building foundation or basement. The lab measured the concentrations of various chemicals in these samples. DNR compares these measurements to the state Vapor Risk Screening Level (VRSL), which identifies the concentration of a chemical in soil gas that scientific research suggests can be a health risk if vapor enters a building. If soil gas measurements exceed the VRSL for a chemical of concern, action to reduce exposure is strongly recommended.

The VRSL is a higher number (higher chemical concentration) than the VAL because it is presumed that concrete building foundations and basement walls will prevent most soil gas from entering a building. Further, any soil gas that does enter a building through cracks, holes, sump pumps, drains, etc., will be diluted to some extent by the indoor air. So, people inside will not be breathing air that includes the full concentration of chemical vapors that exist in the ground.



DNR generally relies on the test results of the sub-slab soil gas samples when determining what, if any, action should be taken related to chemical vapors coming from nearby soil or groundwater contamination. Indoor air quality is highly variable, and it is difficult to make a definitive decision about vapor intrusion based on indoor air sampling alone.

Follow-Up Actions

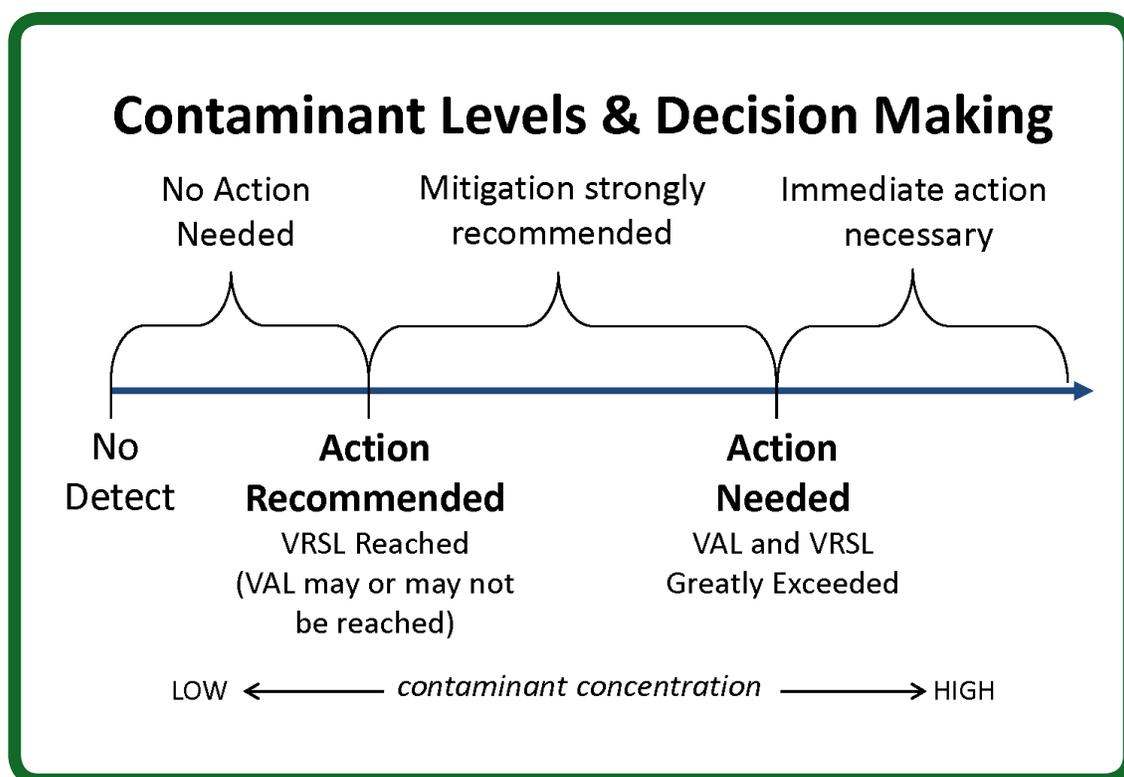
If your test results are less than a VAL for indoor air, or a VRSL for sub-slab soil gas, then the air in the house or building should not present a health concern. Follow-up sampling and testing may be necessary to confirm the results, but no other action is typically suggested.

When test results show soil gas chemical concentrations above a VRSL, both DNR and the Wisconsin Department of

Health Services recommend that owners take action to reduce potential exposure. This typically involves installing a vapor mitigation system that vents chemical vapors from beneath your home or building to the outdoors, similar to a radon mitigation system.

If indoor air concentrations exceed a VAL, but sub-slab concentrations are less than a VRSL, then the chemical vapors are most likely coming from indoor sources. Steps should be taken by the house or building owner to identify the products and practices causing the problem and implement appropriate remedies.

If soil gas mitigation is recommended, a representative of the party who is responsible for the soil or groundwater contamination will contact you to discuss your options.



A Note about Measurement Units: The lab report may include some unfamiliar technical language. The most important point to note is whether or not the test result for a specific chemical exceeds a VAL or VRSL, which are also sometimes referred to, generically, as “screening levels.”

The concentration of gaseous pollutants in air is typically described in two different ways: 1) as units of mass per volume, where $\mu\text{g}/\text{m}^3$ represents micrograms of gaseous pollutant per cubic meter of ambient air; and 2) as parts per billion by volume (ppbv), where the volume of a gaseous pollutant is compared to a set volume of ambient air. These are the numbers that are compared to the VAL and VRSL.

For more information, visit dnr.wi.gov/topic/Brownfields/Vapor.html

www.ghd.com





May 12, 2017

Reference No. 003978

Mr. Tom Onan
Bridge Community Health Clinic
1810 N. 2nd Street
Wausau, Wisconsin 54403

Dear Mr. Onan:

**Re: Sub-slab and Indoor Air Sampling Results
Bridge Community Health Clinic, 1810 N. 2nd Street, Wausau, Wisconsin 54403**

On behalf of the Responsible Parties (RPs) for the Wausau Water Supply Superfund Site, enclosed are the results of a recent investigation on your property by GHD Services Inc. (GHD).

As you are aware, this investigation was conducted because of the potential for contaminant vapors from the groundwater beneath your property to migrate through soils, accumulate beneath the foundation of your clinic, and possibly enter your indoor air. The contaminants of concern in the groundwater are tetrachloroethene (PERC) and trichloroethene (TCE). The history of the Superfund project and the potential concerns to neighboring property owners were described in detail in the original letter sent to you on March 1, 2017.

On April 4, 2017, GHD installed a sampling device into the floor of your foundation and collected a soil vapor sample. In addition, an indoor air sample was collected in the basement level of the clinic. The samples were submitted to TestAmerica Laboratories where they underwent laboratory analysis for four different volatile organic compounds (VOCs), including PERC, TCE, cis-1,2-dichloroethylene (c12DCE), and vinyl chloride (VC).

1. Your Sub-slab Test Results

Attached is a copy of the laboratory report for your sub-slab vapor sample. The results show that PERC and TCE were detected in the sample taken from beneath your foundation. Although these compounds were detected in soil vapors beneath your basement, the levels at which they were detected are such that they do not pose a threat to clinic personnel. This is called "detections below screening levels" as explained in the enclosed fact sheet. The sub-slab results for your property are summarized in Table 1 below and the Wisconsin screening levels for sub-slab vapors at a small commercial property are included for comparison.



Table 1 Sub-slab Results and Wisconsin Screening Levels

| | Date | Units | PERC | TCE | c12-DCE | VC |
|-----------------------------------------------------------|--------|-------|-------|-----|---------|------|
| 1810 N. 2 nd Street Sub-slab Results | 4/4/17 | µg/m3 | 3,000 | 58 | <7.6 | <5.9 |
| <i>Wisconsin Commercial Sub-slab Screening Levels</i> | --- | µg/m3 | 6,000 | 290 | ---(1) | 930 |

2. Your Indoor Air Test Results

The indoor air results are also provided in the attached laboratory report. The results show that small amounts of PERC and TCE were detected in the sample taken from the basement level of the clinic. Although these compounds were detected, the levels were below the action levels set by the State of Wisconsin, indicating that they do not pose a threat to clinic personnel. The indoor air results are summarized in Table 2 below and the Wisconsin action levels for indoor air at a commercial property are included for comparison.

Table 2 Indoor Air Results and Wisconsin Action Levels

| | Date | Units | PERC | TCE | c12DCE | VC |
|----------------------------------------------------------|--------|-------|------|------|--------|--------|
| 1810 N. 2 nd Street Indoor Air Results | 4/4/17 | µg/m3 | 16 | 0.44 | <0.095 | <0.074 |
| <i>Wisconsin Commercial Indoor Air Action Levels</i> | --- | µg/m3 | 180 | 8.8 | ---(1) | 28 |

(1) Neither the State of Wisconsin nor the USEPA have set a health standard for c12DCE in air.

At this time, there does not appear to be risk of significant vapor concentrations entering the clinic from beneath the foundation. Additional sampling will be scheduled for mid-summer and we will contact you to schedule the next sampling event.

The Project Managers for USEPA and WDNR are Sheri Bianchin and Mae Willkom, respectively. Ms. Bianchin can be reached at bianchin.sheri@epa.gov or 312-886-4745. Ms. Willkom can be reached at or 715-839-3748.



Please feel free to contact me at 651-639-0913 if you have any questions about these results.

Sincerely,

GHD

A handwritten signature in black ink, appearing to read "Chuck Ahrens", written in a cursive style.

Chuck Ahrens

651-639-0913

CA/sb/2

Encl.

cc: Mae Willkom, DNR
Sheri Bianchin, USEPA
RP Group

Attachment A Laboratory Report

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

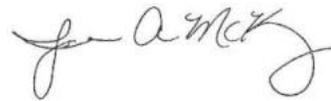
TestAmerica Job ID: 140-7756-1

Client Project/Site: Wausau Vapor Sampling

For:

GHD Services Inc.
1801 Old Highway 8 NW
Suite 114
St. Paul, Minnesota 55112

Attn: Mr. Grant Anderson



Authorized for release by:
4/20/2017 3:13:31 PM

Jamie McKinney, Senior Project Manager
(865)291-3000
jamie.mckinney@testamericainc.com

LINKS

Review your project
results through
TotalAccess

Have a Question?



Visit us at:
www.testamericainc.com

This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17



Table of Contents

| | |
|----------------------------------------|----|
| Cover Page | 1 |
| Table of Contents | 2 |
| Definitions/Glossary | 3 |
| Case Narrative | 4 |
| Detection Summary | 5 |
| Client Sample Results | 7 |
| Default Detection Limits | 11 |
| Surrogate Summary | 12 |
| QC Sample Results | 13 |
| QC Association Summary | 14 |
| Lab Chronicle | 15 |
| Certification Summary | 17 |
| Method Summary | 18 |
| Sample Summary | 19 |
| Chain of Custody | 20 |
| Receipt Checklists | 23 |
| Clean Canister Certification | 24 |
| Clean Canister Data | 24 |

Definitions/Glossary

Client: GHD Services Inc.
Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-7756-1

Qualifiers

Air - GC/MS VOA

| Qualifier | Qualifier Description |
|-----------|----------------------------------------------------------------------------------------------------------------|
| J | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |
| E | Result exceeded calibration range. |

Glossary

| Abbreviation | These commonly used abbreviations may or may not be present in this report. |
|----------------|-------------------------------------------------------------------------------------------------------------|
| α | Listed under the "D" column to designate that the result is reported on a dry weight basis |
| %R | Percent Recovery |
| CFL | Contains Free Liquid |
| CNF | Contains no Free Liquid |
| DER | Duplicate error ratio (normalized absolute difference) |
| Dil Fac | Dilution Factor |
| DL, RA, RE, IN | Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample |
| DLC | Decision level concentration |
| MDA | Minimum detectable activity |
| EDL | Estimated Detection Limit |
| MDC | Minimum detectable concentration |
| MDL | Method Detection Limit |
| ML | Minimum Level (Dioxin) |
| NC | Not Calculated |
| ND | Not detected at the reporting limit (or MDL or EDL if shown) |
| PQL | Practical Quantitation Limit |
| QC | Quality Control |
| RER | Relative error ratio |
| RL | Reporting Limit or Requested Limit (Radiochemistry) |
| RPD | Relative Percent Difference, a measure of the relative difference between two points |
| TEF | Toxicity Equivalent Factor (Dioxin) |
| TEQ | Toxicity Equivalent Quotient (Dioxin) |

Case Narrative

Client: GHD Services Inc.
Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-7756-1

Job ID: 140-7756-1

Laboratory: TestAmerica Knoxville

Narrative

Job Narrative
140-7756-1

Comments

No additional comments.

Receipt

The samples were received on 4/10/2017 10:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

Air - GC/MS VOA

This report includes canister certification data for the batch certified canisters used to collect samples. All of the canisters used for sample collection for this job were batch certified clean to the levels listed on the results page. Additionally, the canisters were checked down to the method detection limit (MDL) for chloroform.

Method(s) TO 15 LL, TO-14A, TO-15: EPA methods TO-14A and TO-15 specify the use of humidified "zero air" as the blank reagent for canister cleaning, instrument calibration and sample analysis. Ultra-high purity humidified nitrogen from a cryogenic reservoir is used in place of "zero air" by TestAmerica Knoxville.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Client Sample Results

Client: GHD Services Inc.
 Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-7756-1

Client Sample ID: SS-170404-RA-06

*Bridge Clinic
 Sub-slab*

Lab Sample ID: 140-7756-6

Date Collected: 04/04/17 14:25

Matrix: Air

Date Received: 04/10/17 10:15

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|-----------------------------|-------------|-----------|----------|-----|---------|---|----------|----------------|---------|
| cis-1,2-Dichloroethene | ND | | 6.4 | 1.9 | ppb v/v | | | 04/17/17 16:02 | 1.59 |
| Tetrachloroethene | 440 | | 6.4 | 1.3 | ppb v/v | | | 04/17/17 16:02 | 1.59 |
| Trichloroethene | 11 | | 3.2 | 1.1 | ppb v/v | | | 04/17/17 16:02 | 1.59 |
| Vinyl chloride | ND | | 3.2 | 2.3 | ppb v/v | | | 04/17/17 16:02 | 1.59 |
| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
| cis-1,2-Dichloroethene | ND | | 25 | 7.6 | ug/m3 | | | 04/17/17 16:02 | 1.59 |
| Tetrachloroethene | 3000 | | 43 | 8.6 | ug/m3 | | | 04/17/17 16:02 | 1.59 |
| Trichloroethene | 58 | | 17 | 6.0 | ug/m3 | | | 04/17/17 16:02 | 1.59 |
| Vinyl chloride | ND | | 8.1 | 5.9 | ug/m3 | | | 04/17/17 16:02 | 1.59 |
| Surrogate | %Recovery | Qualifier | Limits | | | | Prepared | Analyzed | Dil Fac |
| 4-Bromofluorobenzene (Surr) | 104 | | 60 - 140 | | | | | 04/17/17 16:02 | 1.59 |





Client Sample ID: IA-170404-RA-03 *Bridge Clinic* **Lab Sample ID: 140-7756-2**
Date Collected: 04/04/17 11:15 *Indoor Air - Basement* **Matrix: Air**
Date Received: 04/10/17 10:15
Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|-----------------------------|--------------|-----------|----------|-------|---------|---|----------|----------------|---------|
| cis-1,2-Dichloroethene | ND | | 0.080 | 0.024 | ppb v/v | | | 04/17/17 17:54 | 1.64 |
| Tetrachloroethene | 2.3 | | 0.080 | 0.016 | ppb v/v | | | 04/17/17 17:54 | 1.64 |
| Trichloroethene | 0.081 | | 0.040 | 0.014 | ppb v/v | | | 04/17/17 17:54 | 1.64 |
| Vinyl chloride | ND | | 0.040 | 0.029 | ppb v/v | | | 04/17/17 17:54 | 1.64 |
| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
| cis-1,2-Dichloroethene | ND | | 0.32 | 0.095 | ug/m3 | | | 04/17/17 17:54 | 1.64 |
| Tetrachloroethene | 16 | | 0.54 | 0.11 | ug/m3 | | | 04/17/17 17:54 | 1.64 |
| Trichloroethene | 0.44 | | 0.21 | 0.075 | ug/m3 | | | 04/17/17 17:54 | 1.64 |
| Vinyl chloride | ND | | 0.10 | 0.074 | ug/m3 | | | 04/17/17 17:54 | 1.64 |
| Surrogate | %Recovery | Qualifier | Limits | | | | Prepared | Analyzed | Dil Fac |
| 4-Bromofluorobenzene (Surr) | 89 | | 60 - 140 | | | | | 04/17/17 17:54 | 1.64 |

Attachment B Fact Sheet



Understanding Chemical Vapor Intrusion Testing Results

From the Lab to You

Chemical vapor samples were taken from underneath your house or building and possibly indoors as well. These samples have been tested by a certified laboratory and a report was issued. The Wisconsin Department of Natural Resources (DNR) uses these test results to determine if people in the building are being exposed to chemical vapors coming from nearby contaminated soil or groundwater, and to decide what, if any, action is needed to prevent this exposure.

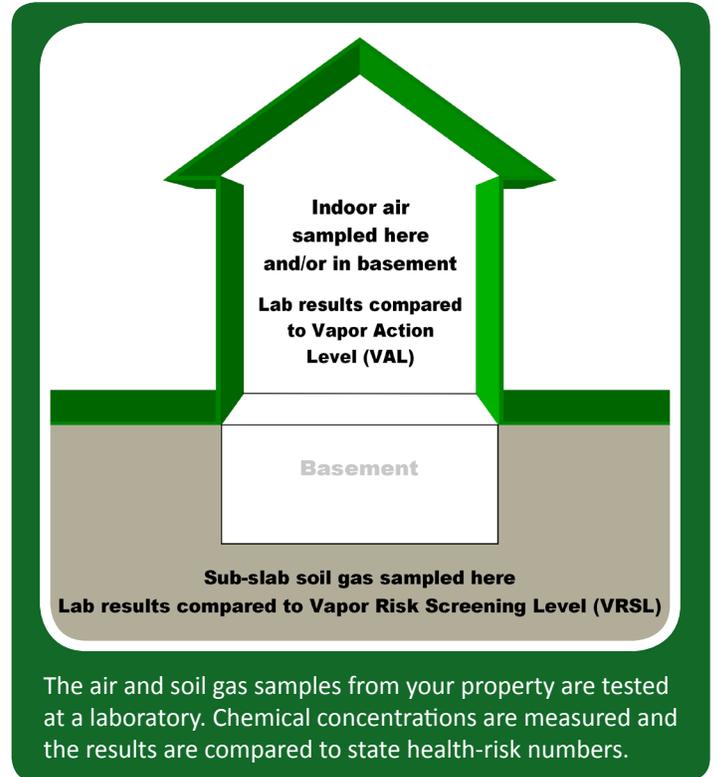
Indoor Air Testing Results

If indoor air samples were collected in your house or building, test results from the lab will be compared to the state Vapor Action Level (VAL) for chemicals of concern. The VAL is a chemical compound's numerical value that represents a health hazard risk to no more than 1 in 100,000 people during a lifetime of exposure. If test results show chemical concentrations in your air below the VAL then adverse health effects are extremely rare, even if you were to breathe the chemical at this concentration for your entire life.

Test results showing chemical concentrations in the air at or above the VAL prompt DNR to recommend that exposure to these chemical vapors be reduced. If test results show concentrations significantly above the VAL, or more than one type of chemical vapor is identified in your indoor air, the risk from exposure increases. If the concentration of any indoor chemical vapor greatly exceeds the VAL, DNR is concerned about even short-term exposure and will typically require immediate action to address the problem.

The VAL for each chemical is set by scientific research. It is protective of all people, including those who are most susceptible to adverse health effects.

If test results identify chemicals in your air that are not present in nearby soil or groundwater contamination, it is likely that these vapors are coming from some product or activity in or near your house or building. Many everyday consumer products (e.g., cleaners, solvents, polish, adhesives, lubricants, aerosols, insect repellants, etc.); combustion processes (e.g., smoking, home heating); fuels in attached garages; dry cleaned clothing or draperies; and occupant activities (e.g., craft hobbies), also release chemical vapors into the air.



Sub-slab Soil Gas Testing Results

Soil gas samples were collected from the ground beneath the concrete slab of your building foundation or basement. The lab measured the concentrations of various chemicals in these samples. DNR compares these measurements to the state Vapor Risk Screening Level (VRSL), which identifies the concentration of a chemical in soil gas that scientific research suggests can be a health risk if vapor enters a building. If soil gas measurements exceed the VRSL for a chemical of concern, action to reduce exposure is strongly recommended.

The VRSL is a higher number (higher chemical concentration) than the VAL because it is presumed that concrete building foundations and basement walls will prevent most soil gas from entering a building. Further, any soil gas that does enter a building through cracks, holes, sump pumps, drains, etc., will be diluted to some extent by the indoor air. So, people inside will not be breathing air that includes the full concentration of chemical vapors that exist in the ground.



DNR generally relies on the test results of the sub-slab soil gas samples when determining what, if any, action should be taken related to chemical vapors coming from nearby soil or groundwater contamination. Indoor air quality is highly variable, and it is difficult to make a definitive decision about vapor intrusion based on indoor air sampling alone.

Follow-Up Actions

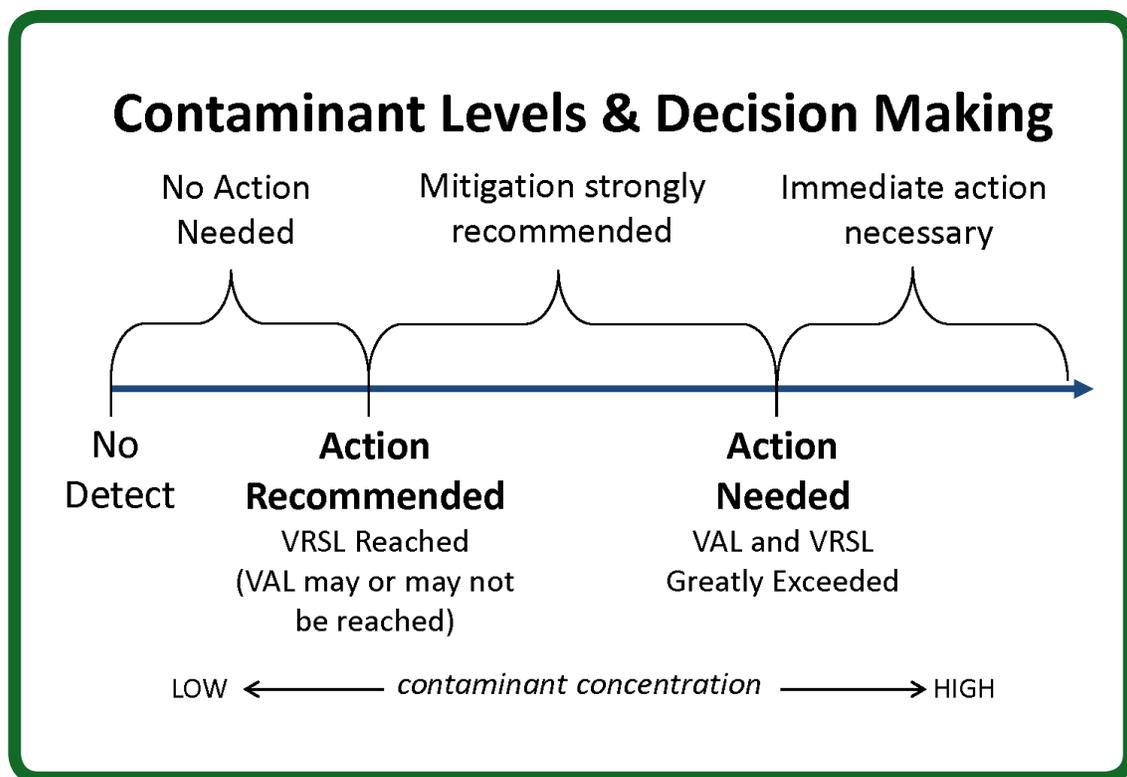
If your test results are less than a VAL for indoor air, or a VRSL for sub-slab soil gas, then the air in the house or building should not present a health concern. Follow-up sampling and testing may be necessary to confirm the results, but no other action is typically suggested.

When test results show soil gas chemical concentrations above a VRSL, both DNR and the Wisconsin Department of

Health Services recommend that owners take action to reduce potential exposure. This typically involves installing a vapor mitigation system that vents chemical vapors from beneath your home or building to the outdoors, similar to a radon mitigation system.

If indoor air concentrations exceed a VAL, but sub-slab concentrations are less than a VRSL, then the chemical vapors are most likely coming from indoor sources. Steps should be taken by the house or building owner to identify the products and practices causing the problem and implement appropriate remedies.

If soil gas mitigation is recommended, a representative of the party who is responsible for the soil or groundwater contamination will contact you to discuss your options.



A Note about Measurement Units: The lab report may include some unfamiliar technical language. The most important point to note is whether or not the test result for a specific chemical exceeds a VAL or VRSL, which are also sometimes referred to, generically, as “screening levels.”

The concentration of gaseous pollutants in air is typically described in two different ways: 1) as units of mass per volume, where $\mu\text{g}/\text{m}^3$ represents micrograms of gaseous pollutant per cubic meter of ambient air; and 2) as parts per billion by volume (ppbv), where the volume of a gaseous pollutant is compared to a set volume of ambient air. These are the numbers that are compared to the VAL and VRSL.

For more information, visit dnr.wi.gov/topic/Brownfields/Vapor.html



May 11, 2017

Reference No. 003978

Jill and Gregory Viergutz
1915 N. 2nd Street
Wausau, Wisconsin 54403

Dear Mr. and Ms. Viergutz:

**Re: Sub-slab and Indoor Air Sampling Results
1915 N. 2nd Street, Wausau, Wisconsin 54403**

On behalf of the Responsible Parties (RPs) for the Wausau Water Supply Superfund Site, enclosed are the results of a recent investigation on your property by GHD Services Inc. (GHD).

As you are aware, this investigation was conducted because of the potential for contaminant vapors from the groundwater beneath your property to migrate through soils, accumulate beneath the foundation of your house, and possibly enter your indoor air. The contaminants of concern in the groundwater are tetrachloroethene (PERC) and trichloroethene (TCE). The history of the Superfund project and the potential concerns to neighboring property owners were described in the original letter sent to you on March 13, 2017.

On April 4, 2017, GHD installed a sampling device into the floor of your foundation and collected a soil vapor sample. In addition, an indoor air sample was collected on the ground floor of your home. The samples were submitted to TestAmerica Laboratories where they underwent laboratory analysis for four different volatile organic compounds (VOCs), including PERC, TCE, cis-1,2-dichloroethylene (c12DCE), and vinyl chloride (VC).

1. Your Sub-slab Test Results

Attached is a copy of the laboratory report for your sub-slab vapor sample. The results show that PERC and TCE were detected in the sample taken from beneath your foundation. Although these compounds were detected in soil vapors beneath your basement, the levels at which they were detected are such that they do not pose a threat to you or your family. This is called "detections below screening levels" as explained in the enclosed fact sheet. The sub-slab results for your property are summarized in Table 1 below and the Wisconsin screening levels for sub-slab vapors at residential properties are included for comparison.



Table 1 Sub-slab Results and Wisconsin Screening Levels

| | Date | Units | PERC | TCE | c12-DCE | VC |
|------------------------------------------------------------|--------|-------|-------|-----|---------|--------|
| 1915 N. 2 nd Street Sub-slab Results | 4/4/17 | µg/m3 | 63 | 3.5 | <0.095 | <0.074 |
| <i>Wisconsin Residential Sub-slab Screening Levels</i> | --- | µg/m3 | 1,400 | 70 | ---(1) | 57 |

2. Your Indoor Air Test Results

The indoor air results are also provided in the attached laboratory report. The results show that small amounts of PERC and TCE were detected in the sample taken from the ground floor of your home. Although these compounds were detected, the levels were below the action levels set by the State of Wisconsin, indicating that they do not pose a threat to you or your family. The indoor air results are summarized in Table 2 below and the Wisconsin action levels for indoor air at residential properties are included for comparison.

Table 2 Indoor Air Results and Wisconsin Action Levels

| | Date | Units | PERC | TCE | c12DCE | VC |
|-----------------------------------------------------------|--------|-------|------|------|--------|--------|
| 1915 N. 2 nd Street Indoor Air Results | 4/4/17 | µg/m3 | 1.1 | 0.33 | <0.095 | <0.074 |
| <i>Wisconsin Residential Indoor Air Action Levels</i> | --- | µg/m3 | 42 | 2.1 | ---(1) | 1.7 |

(1) Neither the State of Wisconsin nor the USEPA have set a health standard for c12DCE in air

At this time, there does not appear to be a risk of significant vapor concentrations entering your home from beneath the foundation. Additional sampling will be scheduled for mid-summer and we will contact you to schedule the next sampling event.

The Project Managers for USEPA and WDNR are Sheri Bianchin and Mae Willkom, respectively. Ms. Bianchin can be reached at bianchin.sheri@epa.gov or 312-886-4745. Ms. Willkom can be reached at or 715-839-3748.



Please feel free to contact me at 651-639-0913 if you have any questions about these results.

Sincerely,

GHD

A handwritten signature in black ink, appearing to read 'Chuck Ahrens', written in a cursive style.

Chuck Ahrens

651-639-0913

CA/sb/1

Encl.

cc: Mae Willkom, DNR
Sheri Bianchin, USEPA
RP Group

Attachment A Laboratory Report

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

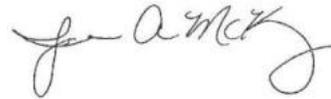
ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

TestAmerica Job ID: 140-7756-1
Client Project/Site: Wausau Vapor Sampling

For:
GHD Services Inc.
1801 Old Highway 8 NW
Suite 114
St. Paul, Minnesota 55112

Attn: Mr. Grant Anderson



Authorized for release by:
4/20/2017 3:13:31 PM

Jamie McKinney, Senior Project Manager
(865)291-3000
jamie.mckinney@testamericainc.com

LINKS

Review your project
results through
TotalAccess

Have a Question?



Visit us at:
www.testamericainc.com

This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17



Table of Contents

| | |
|----------------------------------------|----|
| Cover Page | 1 |
| Table of Contents | 2 |
| Definitions/Glossary | 3 |
| Case Narrative | 4 |
| Detection Summary | 5 |
| Client Sample Results | 7 |
| Default Detection Limits | 11 |
| Surrogate Summary | 12 |
| QC Sample Results | 13 |
| QC Association Summary | 14 |
| Lab Chronicle | 15 |
| Certification Summary | 17 |
| Method Summary | 18 |
| Sample Summary | 19 |
| Chain of Custody | 20 |
| Receipt Checklists | 23 |
| Clean Canister Certification | 24 |
| Clean Canister Data | 24 |

Definitions/Glossary

Client: GHD Services Inc.
Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-7756-1

Qualifiers

Air - GC/MS VOA

| Qualifier | Qualifier Description |
|-----------|----------------------------------------------------------------------------------------------------------------|
| J | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |
| E | Result exceeded calibration range. |

Glossary

| Abbreviation | These commonly used abbreviations may or may not be present in this report. |
|----------------|-------------------------------------------------------------------------------------------------------------|
| α | Listed under the "D" column to designate that the result is reported on a dry weight basis |
| %R | Percent Recovery |
| CFL | Contains Free Liquid |
| CNF | Contains no Free Liquid |
| DER | Duplicate error ratio (normalized absolute difference) |
| Dil Fac | Dilution Factor |
| DL, RA, RE, IN | Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample |
| DLC | Decision level concentration |
| MDA | Minimum detectable activity |
| EDL | Estimated Detection Limit |
| MDC | Minimum detectable concentration |
| MDL | Method Detection Limit |
| ML | Minimum Level (Dioxin) |
| NC | Not Calculated |
| ND | Not detected at the reporting limit (or MDL or EDL if shown) |
| PQL | Practical Quantitation Limit |
| QC | Quality Control |
| RER | Relative error ratio |
| RL | Reporting Limit or Requested Limit (Radiochemistry) |
| RPD | Relative Percent Difference, a measure of the relative difference between two points |
| TEF | Toxicity Equivalent Factor (Dioxin) |
| TEQ | Toxicity Equivalent Quotient (Dioxin) |

Case Narrative

Client: GHD Services Inc.
Project/Site: Wausau Vapor Sampling

TestAmerica Job ID: 140-7756-1

Job ID: 140-7756-1

Laboratory: TestAmerica Knoxville

Narrative

Job Narrative
140-7756-1

Comments

No additional comments.

Receipt

The samples were received on 4/10/2017 10:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

Air - GC/MS VOA

This report includes canister certification data for the batch certified canisters used to collect samples. All of the canisters used for sample collection for this job were batch certified clean to the levels listed on the results page. Additionally, the canisters were checked down to the method detection limit (MDL) for chloroform.

Method(s) TO 15 LL, TO-14A, TO-15: EPA methods TO-14A and TO-15 specify the use of humidified "zero air" as the blank reagent for canister cleaning, instrument calibration and sample analysis. Ultra-high purity humidified nitrogen from a cryogenic reservoir is used in place of "zero air" by TestAmerica Knoxville.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.





Client Sample ID: SS-170404-RA-09
 Date Collected: 04/04/17 17:52
 Date Received: 04/10/17 10:15
 Sample Container: Summa Canister 6L

1915 N. 2nd St.
 Subslab

Lab Sample ID: 140-7756-9
 Matrix: Air

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|-----------------------------|-------------|-----------|----------|-------|---------|---|----------|----------------|---------|
| cis-1,2-Dichloroethene | ND | | 0.080 | 0.024 | ppb v/v | | | 04/17/17 23:19 | 1 |
| Tetrachloroethene | 9.3 | | 0.080 | 0.016 | ppb v/v | | | 04/17/17 23:19 | 1 |
| Trichloroethene | 0.64 | | 0.040 | 0.014 | ppb v/v | | | 04/17/17 23:19 | 1 |
| Vinyl chloride | ND | | 0.040 | 0.029 | ppb v/v | | | 04/17/17 23:19 | 1 |
| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
| cis-1,2-Dichloroethene | ND | | 0.32 | 0.095 | ug/m3 | | | 04/17/17 23:19 | 1 |
| Tetrachloroethene | 63 | | 0.54 | 0.11 | ug/m3 | | | 04/17/17 23:19 | 1 |
| Trichloroethene | 3.5 | | 0.21 | 0.075 | ug/m3 | | | 04/17/17 23:19 | 1 |
| Vinyl chloride | ND | | 0.10 | 0.074 | ug/m3 | | | 04/17/17 23:19 | 1 |
| Surrogate | %Recovery | Qualifier | Limits | | | | Prepared | Analyzed | Dil Fac |
| 4-Bromofluorobenzene (Surr) | 97 | | 60 - 140 | | | | | 04/17/17 23:19 | 1 |



Client Sample ID: IA-170404-RA-06

1915 N. 2nd St.

Lab Sample ID: 140-7756-5

Date Collected: 04/04/17 15:50

Indoor Air - Ground Floor

Matrix: Air

Date Received: 04/10/17 10:15

Sample Container: Summa Canister 6L

Method: TO 15 LL - Volatile Organic Compounds in Ambient Air, Low Concentration (GC/MS)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|--------------------------|--------------|-----------|-------|-------|---------|---|----------|----------------|---------|
| cis-1,2-Dichloroethene | ND | | 0.080 | 0.024 | ppb v/v | | | 04/17/17 20:37 | 1 |
| Tetrachloroethene | 0.16 | | 0.080 | 0.016 | ppb v/v | | | 04/17/17 20:37 | 1 |
| Trichloroethene | 0.061 | | 0.040 | 0.014 | ppb v/v | | | 04/17/17 20:37 | 1 |
| Vinyl chloride | ND | | 0.040 | 0.029 | ppb v/v | | | 04/17/17 20:37 | 1 |

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|--------------------------|-------------|-----------|------|-------|-------|---|----------|----------------|---------|
| cis-1,2-Dichloroethene | ND | | 0.32 | 0.095 | ug/m3 | | | 04/17/17 20:37 | 1 |
| Tetrachloroethene | 1.1 | | 0.54 | 0.11 | ug/m3 | | | 04/17/17 20:37 | 1 |
| Trichloroethene | 0.33 | | 0.21 | 0.075 | ug/m3 | | | 04/17/17 20:37 | 1 |
| Vinyl chloride | ND | | 0.10 | 0.074 | ug/m3 | | | 04/17/17 20:37 | 1 |

| Surrogate | %Recovery | Qualifier | Limits | Prepared | Analyzed | Dil Fac |
|-----------------------------|-----------|-----------|----------|----------|----------------|---------|
| 4-Bromofluorobenzene (Surr) | 94 | | 60 - 140 | | 04/17/17 20:37 | 1 |

TestAmerica Knoxville

Attachment B Fact Sheet



Understanding Chemical Vapor Intrusion Testing Results

From the Lab to You

Chemical vapor samples were taken from underneath your house or building and possibly indoors as well. These samples have been tested by a certified laboratory and a report was issued. The Wisconsin Department of Natural Resources (DNR) uses these test results to determine if people in the building are being exposed to chemical vapors coming from nearby contaminated soil or groundwater, and to decide what, if any, action is needed to prevent this exposure.

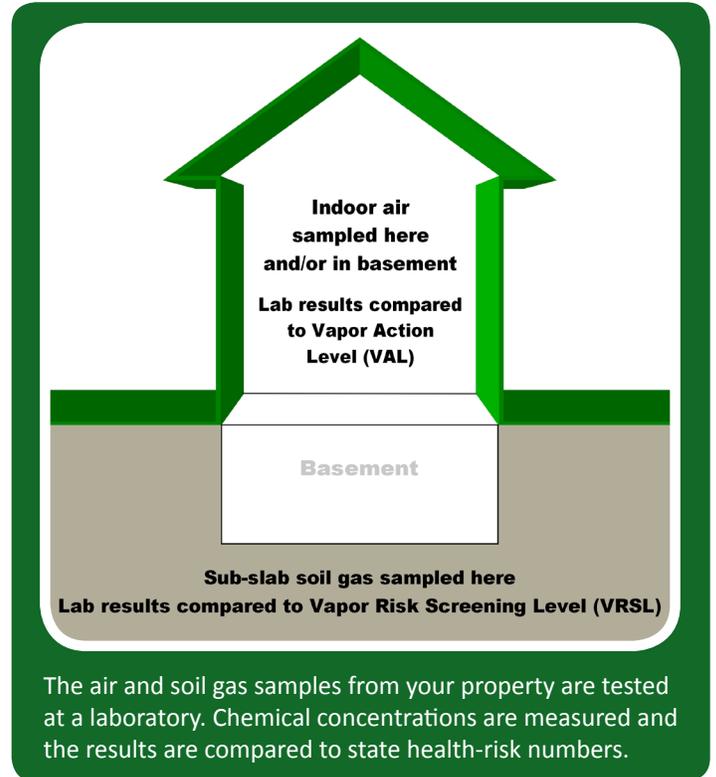
Indoor Air Testing Results

If indoor air samples were collected in your house or building, test results from the lab will be compared to the state Vapor Action Level (VAL) for chemicals of concern. The VAL is a chemical compound's numerical value that represents a health hazard risk to no more than 1 in 100,000 people during a lifetime of exposure. If test results show chemical concentrations in your air below the VAL then adverse health effects are extremely rare, even if you were to breathe the chemical at this concentration for your entire life.

Test results showing chemical concentrations in the air at or above the VAL prompt DNR to recommend that exposure to these chemical vapors be reduced. If test results show concentrations significantly above the VAL, or more than one type of chemical vapor is identified in your indoor air, the risk from exposure increases. If the concentration of any indoor chemical vapor greatly exceeds the VAL, DNR is concerned about even short-term exposure and will typically require immediate action to address the problem.

The VAL for each chemical is set by scientific research. It is protective of all people, including those who are most susceptible to adverse health effects.

If test results identify chemicals in your air that are not present in nearby soil or groundwater contamination, it is likely that these vapors are coming from some product or activity in or near your house or building. Many everyday consumer products (e.g., cleaners, solvents, polish, adhesives, lubricants, aerosols, insect repellants, etc.); combustion processes (e.g., smoking, home heating); fuels in attached garages; dry cleaned clothing or draperies; and occupant activities (e.g., craft hobbies), also release chemical vapors into the air.



Sub-slab Soil Gas Testing Results

Soil gas samples were collected from the ground beneath the concrete slab of your building foundation or basement. The lab measured the concentrations of various chemicals in these samples. DNR compares these measurements to the state Vapor Risk Screening Level (VRSL), which identifies the concentration of a chemical in soil gas that scientific research suggests can be a health risk if vapor enters a building. If soil gas measurements exceed the VRSL for a chemical of concern, action to reduce exposure is strongly recommended.

The VRSL is a higher number (higher chemical concentration) than the VAL because it is presumed that concrete building foundations and basement walls will prevent most soil gas from entering a building. Further, any soil gas that does enter a building through cracks, holes, sump pumps, drains, etc., will be diluted to some extent by the indoor air. So, people inside will not be breathing air that includes the full concentration of chemical vapors that exist in the ground.



DNR generally relies on the test results of the sub-slab soil gas samples when determining what, if any, action should be taken related to chemical vapors coming from nearby soil or groundwater contamination. Indoor air quality is highly variable, and it is difficult to make a definitive decision about vapor intrusion based on indoor air sampling alone.

Follow-Up Actions

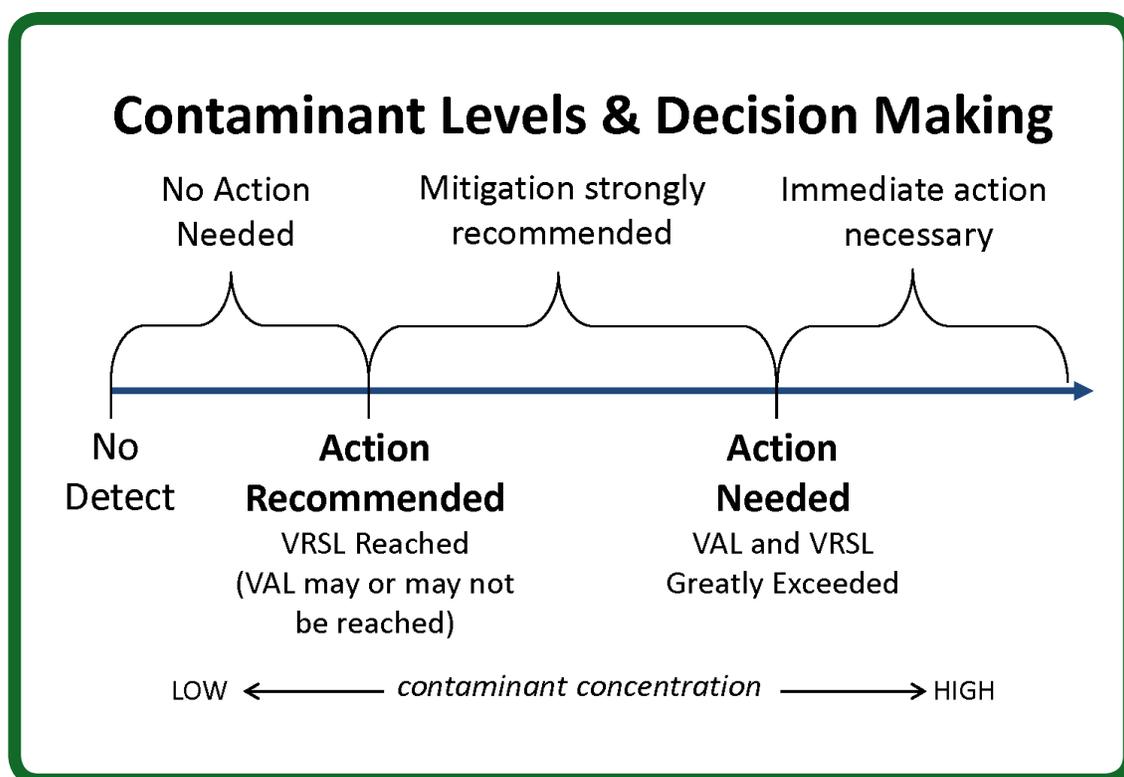
If your test results are less than a VAL for indoor air, or a VRSL for sub-slab soil gas, then the air in the house or building should not present a health concern. Follow-up sampling and testing may be necessary to confirm the results, but no other action is typically suggested.

When test results show soil gas chemical concentrations above a VRSL, both DNR and the Wisconsin Department of

Health Services recommend that owners take action to reduce potential exposure. This typically involves installing a vapor mitigation system that vents chemical vapors from beneath your home or building to the outdoors, similar to a radon mitigation system.

If indoor air concentrations exceed a VAL, but sub-slab concentrations are less than a VRSL, then the chemical vapors are most likely coming from indoor sources. Steps should be taken by the house or building owner to identify the products and practices causing the problem and implement appropriate remedies.

If soil gas mitigation is recommended, a representative of the party who is responsible for the soil or groundwater contamination will contact you to discuss your options.



A Note about Measurement Units: The lab report may include some unfamiliar technical language. The most important point to note is whether or not the test result for a specific chemical exceeds a VAL or VRSL, which are also sometimes referred to, generically, as "screening levels."

The concentration of gaseous pollutants in air is typically described in two different ways: 1) as units of mass per volume, where $\mu\text{g}/\text{m}^3$ represents micrograms of gaseous pollutant per cubic meter of ambient air; and 2) as parts per billion by volume (ppbv), where the volume of a gaseous pollutant is compared to a set volume of ambient air. These are the numbers that are compared to the VAL and VRSL.

For more information, visit dnr.wi.gov/topic/Brownfields/Vapor.html